

Sydney International Airport

Case Study: Chilled Water Plant Optimisation



Efficiency
Uplift

33.4%



Energy
Saved

**890,094
kWh**



Emissions
Reductions

**1,377
tCO₂**



Dollars
Saved p.a.

\$243,880

Handling over three million passengers annually, the airport operates one of Australia's most complex chilled-water systems, supporting critical terminal cooling operations.

Exergenics' machine learning optimisation engine was deployed to enhance plant performance, delivering a 33.4% improvement in energy efficiency and reducing greenhouse gas emissions by 1,377 tCO₂e within the first 12 months of operation. The project achieved significant cost and carbon credit savings, reinforcing the airport's commitment to sustainable operations.

Seamless Plant Optimisation

No Black Box. No Training. No Security Issues

exergenics.com



The Challenge...

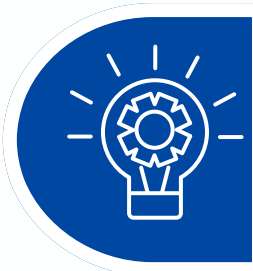
Sydney international airport operates a large, mission-critical chilled-water plant that supports terminal and passenger facility cooling. Despite a capable control system, the plant experienced high baseline energy use and limited flexibility under changing load conditions. These operating conditions required a low load to be run in the winter months to maintain conditions, which is where the Exergenics algorithm was able to extract the most efficiency uplift via the Machine Learning generated updates to the plants Staging Setpoints and Condenser Water Temperature controls.

The EXERGENICS Way



Data & Documentation

Performance data was collected through the airport's data warehousing platform, including chiller, pump, and cooling tower trend data. The Facilities Management team provided operational insights that informed a validated baseline model, supporting accurate benchmarking and optimisation roadmap.



Strategy Development

Exergenics designed an optimisation strategy focused on refining chiller loading and condenser-water temperature control. System constraints were adjusted based on site feedback to ensure reliability while targeting maximum energy efficiency within existing BMS parameters, while ensure load requirements and occupant comfort was met at all times.



Strategy Implementation

In March 2023, the airport integrated Exergenics' optimisation recommendations directly written into the BMS. The deployment required no hardware additions and maintained continuous operations while drastically improving plant efficiency from the minute it was enabled.



Measurement & Verification

Measurement and Verification (M&V) confirmed a 33.4% improvement in chilled-water plant energy efficiency, reducing 1,377 tCO₂e annually and achieving \$243,880 in energy savings and AUD \$165,230 in carbon credit value. Verified results demonstrated lasting efficiency gains and dependable performance across operational conditions.

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